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(56) Documents cited

GB 2133975 A

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(58) Field of search

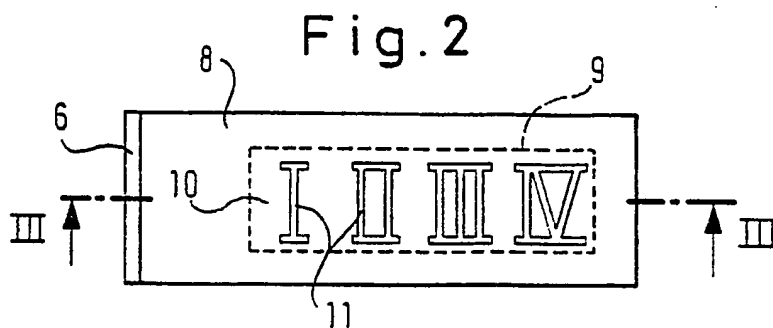
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(54) Water hardness indicating in an appliance operating with water

(57) An appliance operating with water, such as a washing or dishwashing machine, includes functional devices operable in a manner or sequence taking into consideration the degree of hardness or the range of the degree of hardness of the local mains water. In a region, readily visible to the operator of the appliance, the outer surface of the appliance has a space for the mounting of an indicating member with symbols associated with the degrees or ranges of hardness. A surface (9) of the member is provided with a coating (10) in which symbols (11) are defined by colour-change substances which are of substantially the same colour as the coating and which, on being wetted with water of an associated degree or range of hardness, change into a colour visibly departing from the original colour and the colour of the coating.



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Fig. 1

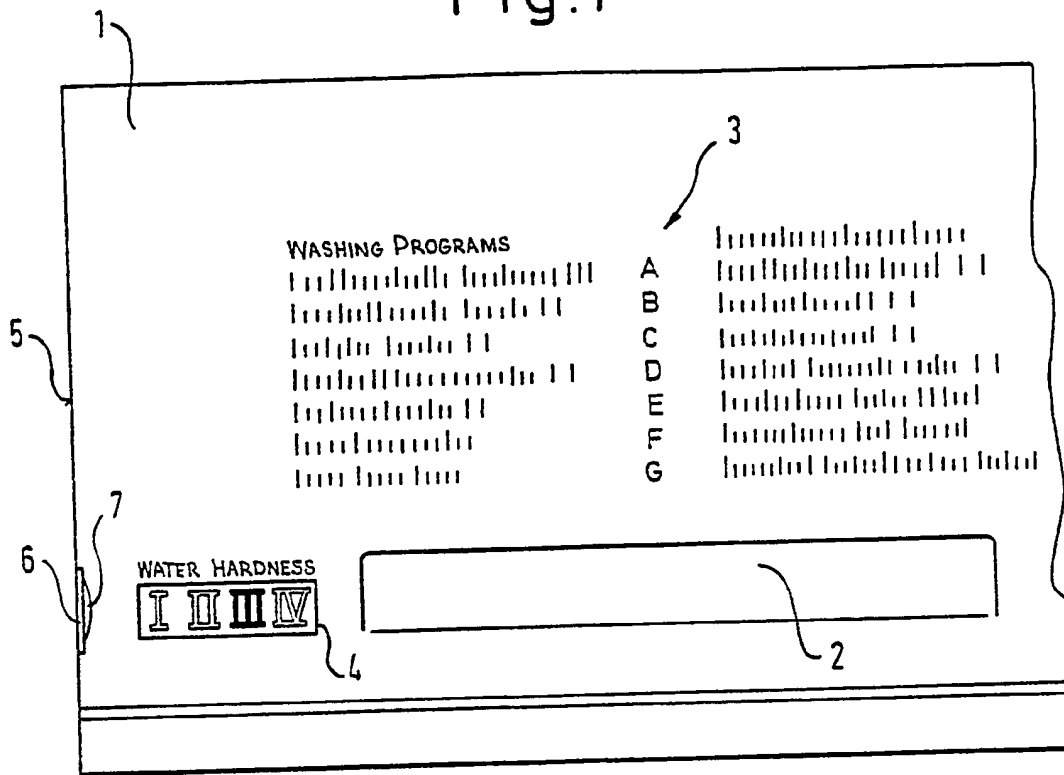


Fig. 2

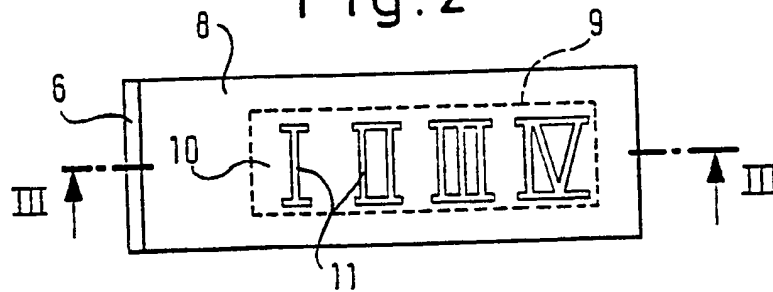
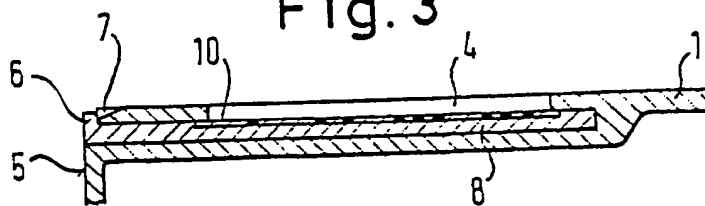


Fig. 3



WATER HARDNESS INDICATION IN AN APPLIANCE OPERATING WITH WATER

The present invention relates to an appliance operating with water.

Domestic appliances, such as those described in German Utility Models 79 22 031 and 79 36 829, comprise water hardness indicators which are relatively expensive to manufacture, in the first case due to mounting of an adjusting device with printed numbers denoting the ranges of the degree of hardness and in the second case due to the need to plug in or otherwise mount indicating devices in the form of separate parts supplied in an auxiliary package. Such parts must be added four times (in correspondence with the number of ranges of the degree of hardness) for each appliance. Furthermore, the difficulty exists for the operator of the appliance of ascertaining, from the appropriate water company, the local range of water hardness. Errors in this respect cannot be excluded, so that a wrong range of hardness can be noted.

The first of the three difficulties can be avoided if a known test strip with colour transition substances is added to the appliance. The operator can wet this test strip with the local mains water and transfer the colour transition result into the noting device. The other two difficulties still remain, however.

There is thus a need for measures whereby the operator may be able to ascertain the local degree of water hardness or the range of the degree of water hardness applicable not only by a "test strip", but also with permanent indication at the appliance.

According to the present invention there is provided an appliance operating with mains water and comprising functional means operable in a manner or sequence taking into consideration the degree of range of hardness of the mains water supplied to the appliance and indicating means for providing an indication of the degree or range of such water hardness, the indicating means comprising a surface which is visible exteriorly of the appliance and provided with symbols each formed by a substance which is of substantially the same colour as the surface and which changes into a visually distinguishable other colour on being wetted by water of a respective degree or range of hardness.

In a preferred embodiment, the appliance, such as a washing or dishwashing machine, comprises equipment the operation or orderly sequence of which depends on taking into consideration the degree of hardness or the range of the degree of hardness of the supplied mains water and which in a region, that is readily visible to the operator, of an outer surface of the appliance, in particular in an operating panel, has a receiving space for the mounting of an indicating device with symbols associated with the degrees of hardness or the ranges of the degree of hardness. An easily visible surface of the indicating device is provided with a coating, in which the symbols are embedded by transition substances which are of the same colour as the coating and which, on being wetted with water of a respectively associated degree of hardness or range of degree of hardness, change into a colour visibly departing from the original colour and the colour of coating.

Through such a measure, the operator has the possibility of wetting the coating of the indicating device directly by means of the local mains water, to await the colour transition and then, for example, to place this device in a respective receiving space at the outer surface of the appliance. This measure is distinguished not only by the fact that - as for a test strip - any colour transition is visible and, in conjunction with an appropriate explanation, enables notional association with a range of degree of hardness, but also by the fact that the substances themselves contain symbols which provide an association, thus without the need for explanation, with the respective ranges of hardness or with appropriate adjacent printing on an operating panel of the appliance.

For good visibility of the symbols, it is of particular advantage if the coating consists of a matt lacquer and the colour-change substances are applied over the lacquer.

A very clear association of the symbols with the respective ranges or degree of water hardness is achieved if the symbols are geometric symbols applied at different locations of the surface and spatially corresponding with numbers, which denote degrees of hardness or ranges or degree of hardness, on the surface of the appliance. For example, the symbols can be arrow tips pointing towards such numbers.

A direct association of the symbols with degrees of hardness or ranges of degree of hardness is obtained if the symbols are numbers directly denoting the degrees of hardness or ranges of hardness. In this case the respective colour-transition substance can be applied on or embedded in the coating and in the form of a Roman or an Arabic number or numeral. The number subject to the colour transition then becomes directly visible on its own, so that only this number is recognisable at the appliance.

The indicating means can, in particularly advantageous manner, be constructed in that it comprises an areal body which is so removably arranged in a cavity behind a window in a wall of the temperature that its surface carrying the symbols is visible through the window. The
5 indicating means is in that case well protected in the position of use and can easily be taken out for the purpose of activation and then plugged back into the cavity by the operator.

In particularly advantageous manner the cavity can be arranged in an operating panel and open at one side thereof. The areal body
10 itself can be a substantially flat body such as a plate or panel, which can be guided with sliding fit in the cavity.

In a development of an end portion of the body projects out of the cavity and has a grip for engagement by, for example, a fingernail of the operator, such an arrangement being particularly easy to
15 manipulate.

An embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying drawings in which:

Fig. 1 is a front elevation of part of an operating panel of a
20 washing agent flushing-in bowl in a washing machine embodying the invention;

Fig. 2 is a view of a water hardness indicating member removed from the panel; and

Fig. 3 is a cross-section of the member along the line III-III in
25 Fig. 2.

Referring now to the drawing, there is shown part of a washing machine front panel 1 on which is printed, above a grip recess 2 of a washing agent flushing-in bowl (not illustrated), a legend 3 to guide the operator of the machine when setting a program control device of the machine. A window 4, which is inscribed "water hardness", is incorporated in the panel 1 to the left of the recess 2. A flat plate 8 (Figs. 2 and 3), which serves as an indicating device for local water hardness, is inserted into a cavity behind the window 4 such that an inscription 10 on the plate is readable through the window 4. A small cut-out, in which a grip strip 6 of the plate 8 can be engaged, is provided at the lefthand edge 5 of the panel 1. A grip depression 7, which can receive a fingernail of the operator, is present to assist gripping of the strip 6 for the purpose of drawing-out of the plate 8.

In Fig. 2, the plate 8 is illustrated with the grip 6 arranged at the left. A field 9, which is framed in dashed lines and on which the inscription 10 is applied, is arranged on the side of the plate 8 facing the window 4. This inscription can be in the form of, for example, a matt, preferably white, lacquer or an off-white surface of the plate otherwise produced of plastics material. Zones 11 of a transition dye reacting to hardness components of water are applied to or worked into the plate surface. This dye changes its initially white or creamlike colour into, for example, a dark green when the water wetting it contains hardness components in a concentration associated with the respective dye.

The indicating device illustrated in Fig. 2 is still unused, thus in the delivery state of the domestic appliance. In the case of Fig. 1, the coating of the plate 8 has already been used and the symbol, in the form a Roman three, has reacted by being wet by water with the range 3 of degree of hardness. The symbols I, II and IV have remained of the same colour as the surrounding surface and the symbol III has changed to dark green. The operator or other persons in the same household and occasionally using the appliance are constantly reminded to select and meter the washing agent always with a view to the range 3 of the degree of hardness.

In place of the illustrated ranges of hardness, finer graduations could, of course, be used, for example the numbers of the measurement scale in the German hardness standard (dH°). Simpler geometric figures for ranges of hardness could also be chosen. A particularly advantageous arrangement can be the shaping of the symbols 11 as acute-angled triangles, the apices of which point to printed numerals, arranged directly beside the window, for example above or below the window, for the associated degrees of hardness.

The indicating device can also be constructed other than as illustrated here, for example in the form of a simple panel or foil, which is coated on a rear face with a self-adhesive coating and which can be inserted into a specially provided flat depression in the operating panel 1. Also feasible is a panel which preferably consists of synthetic material and the rear face of which has one or more detent elements which can detent into corresponding recesses at the front surface of the operating panel 1.

CLAIMS

1. An appliance operating with mains water and comprising functional means operable in a manner or sequence taking into consideration the degree or range of hardness of the mains water supplied to the appliance and indicating means for providing an indication of the
5 degree or range of such water hardness, the indicating means comprising a surface which is visible exteriorly of the appliance and provided with symbols each formed by a substance which is of substantially the same colour as the surface and which changes into a visually distinguishable other colour on being wetted by water of a
10 respective degree or range of hardness.
2. An appliance as claimed in claim 1, wherein the surface is coated.
3. An appliance as claimed in claim 2, wherein the substance forming each symbol is embedded in the coating of the surface.
- 15 4. An appliance as claimed in claim 2, wherein the coating of the surface comprises a matt lacquer and the substance forming each symbol is applied over lacquer.
5. An appliance as claimed in any one of the preceding claims, wherein the symbols are geometric and are spatially associated with
20 respective numbers which denote degrees or ranges of water hardness and are applied to an exterior surface of the appliance.

6. An appliance as claimed in any one of claims 1 to 4, wherein the symbols are numbers denoting degrees or ranges of water hardness.

7. An appliance as claimed in any one of the preceding claims, wherein the surface is provided on a member so arranged in a cavity
5 behind a window in a wall of the appliance that the symbols are visible through the window.

8. An appliance as claimed in claim 7, wherein the member is relatively arranged in the cavity.

9. An appliance as claimed in claim 8, wherein the cavity is
10 provided in an operating panel of the appliance and is open at one side of panel, the member being substantially flat and a sliding fit in the cavity.

10. An appliance as claimed in claim 9, wherein an end portion of the member projects out of the cavity and is provided with a grip to
15 facilitate removal of the member from the cavity.

11. An appliance as claimed in any one of claims 1 to 9, the appliance being a dishwashing machine.

12. An appliance as claimed in any one of claims 1 to 9, the appliance being a laundry washing machine.

20 13. An appliance substantially as hereinbefore described with reference to the accompanying drawings.

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Examiner's report to the Comptroller under
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-9-

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Relevant Technical fields

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(ii) Int Cl (Edition 5) D06F; A47L

Search Examiner

T M JAMES

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

19 FEBRUARY 1993

Documents considered relevant following a search in respect of claims 1-13

Category (see over)	Identity of document and relevant passages		Relevant to claim(s)
Y	GB 2133975 A	(BOSCH-SIEMENS) - See page 1 lines 96-127	1,2,3,4, 11,12
Y	EP 0425815 A2	(MERLONI) - See column 2 lines 37-46	1,2,3,4, 11,12
Y	US 4906395	(STOESBER & BARR) - See whole document	1,2,3,4, 11,12

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

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A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).